Math 341 Assignment 7, Winter 2017 **Due at the start of class on Friday, February 17th**

For this assignment you will be considering the sets

$$S_1 = \left\{ \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 3 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ -2 \\ 1 \end{bmatrix} \right\} \qquad \text{and} \qquad S_2 = \left\{ \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 3 \\ 1 \end{bmatrix}, \begin{bmatrix} 3 \\ 1 \\ 5 \end{bmatrix} \right\}$$

For every question you will be asked if a vector $\mathbf{v}$ (or of some other name) is in the span of $\mathcal{S}_1$ or $\mathcal{S}_2$. In each case, answer either

- No, $\mathbf{v} \notin \text{span}(\mathcal{S}_k)$ (where k is of course one or two) or
- Yes, $\mathbf{v} \in \text{span}(\mathcal{S}_k)$, followed by a *specific* linear combination equalling $\mathbf{v}$.

For most of these you will need to solve a system of equations, but you should be able to do one of them without doing that. Make sure you see which one it is.

1. (a) Is $\mathbf{v}_1 = \begin{bmatrix} 6 \\ -10 \\ 7 \end{bmatrix}$ in the span of $\mathcal{S}_1$? (b) Is $\mathbf{v}_2 = \begin{bmatrix} 2 \\ -2 \\ 1 \end{bmatrix}$ in the span of $\mathcal{S}_1$?

2. (a) Is $\mathbf{u}_1 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ in the span of $\mathcal{S}_2$? (b) Is $\mathbf{u}_2 = \begin{bmatrix} 0 \\ 4 \\ -1 \end{bmatrix}$ in the span of $\mathcal{S}_2$?

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